

Paeonia cathayana D. Y. Hong & K. Y. Pan, a new tree peony, with revision of *P. suffruticosa* ssp. *yinpingmudan*

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Abstract Molecular data and new additional morphological data suggest that the two tree peonies, based on which *Paeonia suffruticosa* ssp. *yinpingmudan* was described as new, belong to two entities, the one from Anhui (*K. Y. Pan and Z. W. Xie 9701*, the type) being a member of *P. ostii*, while the other from Song Xian, Henan Province (*D. Y. Hong et al. H97010*) being a new taxon. *P. suffruticosa* ssp. *yinpingmudan* is here reduced as a synonym of *P. ostii*, and *P. cathayana* D. Y. Hong & K. Y. Pan is described as new based on the specimen from Henan. The new species is closely related to *P. ostii* and *P. jishanensis*, but it differs from the former in having lower leaves with 9 leaflets and petals rose, while from the latter in having leaflets glabrous, ovate or ovate-lanceolate, less lobed, sepals all caudate at the apex and petals rose.

Key words *Paeonia*, taxonomic revision, new species, *Paeonia cathayana* D. Y. Hong & K. Y. Pan, *Paeonia suffruticosa* ssp. *yinpingmudan*, China.

When we (Hong et al., 1998) described *Paeonia suffruticosa* ssp. *yinpingmudan* as new, we cited two specimens, one from a cliff in the Yinping Hill, Chaohu, Anhui Province (*K. Y. Pan & Z. W. Xie 9701*), and the other from a cultivated shrub by Mr. YANG Hui-Fang's house in Secaogou Village, Shigunping, Muzhijie Township, Song Xian, Henan Province (*D. Y. Hong et al. H97010*). The former, which was bought from a local farmer, has only one leaf and several petals (white), while the latter, with rose petals, was introduced from a nearby mountain around 1961, as said by Mr. YANG. They were then considered forming a single entity and possibly a wild form of the cultivated tree peony on the basis of similarity of the leaves, though they have different petal colours. It is regretful that we designated 9701, instead of H97010, as the type of *P. suffruticosa* ssp. *yinpingmudan*, considering that the former came from an individual of wild origin with considerable certainty, but ignoring its incompleteness as a specimen, particularly as a type.

Our recent DNA sequencing data do not support our taxonomic treatment. Nuclear GPAT gene sequencing shows that 9701 and two samples of *P. ostii* T. Hong & J. X. Zhang form a clade with bootstrap of 100% (Zhao et al., 2004), whereas H97010 forms a separate clade (Zhou et al., unpublished). The molecular data from a nuclear gene family, *Adh*_{1A}, *Adh*_{1B} and *Adh*₂ also demonstrate that 9701 and *P. ostii* form a clade, with bootstrap respectively 54% (*Adh*_{1A}), 100% (*Adh*_{1B}) and 58% (*Adh*₂), while H97010 forms another clade with *P. qiui* Y. L. Pei & D. Y. Hong with bootstrap respectively 96% (*Adh*_{1B}) and 66% (*Adh*₂) (Lin et al., 2004). On a cpDNA tree 9701 forms a clade first with *P. ostii* but not with H97010, which forms an independent clade (Zhou et al., unpublished).

Facing the results of multigenic analysis mentioned above we began to doubt our taxonomic treatment (Hong et al., 1998). Haw (2006) strongly argued that *Paeonia*



Fig. 1. A lower leaf of *P. ostii* T. Hong & J. X. Zhang. Drawn by Mr. SUN Ying-Bao from the individual on cliff of the Yinping Shan.

suffruticosa ssp. *yinpingmudan* from Anhui is an element of *P. ostii*, but not the direct progenitor of *P. suffruticosa* Andrews. According to his observation, the peony on the cliff has lower leaves with 11 instead of 9 leaflets. For more information of the wild peony on the cliff in the Yinping Hill, Anhui (9701), Mr. LI Min and Mr. MA Xin-Tang made a trip to the hill in April of 2006. They collected petals falling down the cliff and took a large number of photos using a telelens. Lower leaves of the tree peony on the cliff actually have 13 (but not 9) leaflets, which are ovate-lanceolate or ovate, and mostly entire (Fig. 1). The leaf of the type specimen of *P. suffruticosa* ssp. *yinpingmudan* (9701, with 9 leaflets) (Hong et al., 1998) might be a middle but not lower one. Its flowers are purely white, with purple filaments and disc. Therefore, there are no significant differences between the tree peony (9701) and the specimens of *P. ostii* we have so far examined. However, the tree peony in Song Xian of Henan Province (H97010) (Fig. 2) differs

from it in having lower leaves strictly with nine leaflets, mostly lobed, and having petals rose. Based on the knowledge we have now, the two tree peonies, cited when *P. suffruticosa* ssp. *yinpingmudan* was described as new, actually belong to two entities, 9701 being an element of *P. ostii*, whereas H97010 might be a real wild form of the cultivated tree peony. Thus, *Paeonia suffruticosa* ssp. *yinpingmudan* should be reduced as a synonym of *P. ostii*, while the tree peony from Henan may be described as a new species.

***Paeonia cathayana* D. Y. Hong & K. Y. Pan, sp. nov.** Fig. 2

中原牡丹

Type: China. Henan (河南), Song Xian (嵩县), Muzhijie Township (木植街乡), Shigunping (石滚坪), Secaogou Village (涩草沟村), cultivated by Mr. YANG Hui-Fang's house, 1997-04-28, D. Y. Hong et al. (洪德元等) H97010 (holotype, here designated, PE) (Hong et al., 1998, pl. 1: 3).

Paeonia suffruticosa ssp. *yinpingmudan* D. Y. Hong, K. Y. Pan & Z. W. Xie in Acta Phytotax. Sin. 36: 519. 1998, p.p., quoad specim. ex Henan.

Paeonia yinpingmudan (D. Y. Hong, K. Y. Pan & Z. W. Xie) B. A. Shen ssp. *henanensis* (D. Y. Hong, K. Y. Pan & Z. W. Xie) B. A. Shen in Lishizhen Medic. Mater. Med. Res. 12: 330. 2001. nom. illeg.

Mr. B. A. Shen's *P. yinpingmudan* ssp. *henanensis* (Shen, 2001) is an illegitimate name, because D. Y. Hong and his coworkers have never given the Latin name "*henanensis*", and Shen did not designate a type for his name "*henanensis*" either. However, from Shen's short note in Chinese his "*henanensis*" is clearly connected with D. Y. Hong et al. H97010.

A *P. ostii* T. Hong & J. X. Zhang foliolis 9, plerumque integris et petalis roseis differt; a *P. jishanensis* T. Hong & W. Z. Zhao foliis glabris, aliquod foliolis integris, sepalis omnino apice caudatis et petalis roseis differt.

Shrubs about 0.8 m tall. Leaves glabrous; lower leaves with 9 leaflets; terminal leaflets 8–10 cm long, 7–9 cm wide, 3- or 5-lobed to middle or even beyond, lateral leaflets ovate or ovate-lanceolate, 4–7 cm long, 2–4.5 cm wide, entire or shallowly lobed. Involucrate bracts



Fig. 2. *Paeonia cathayana* D. Y. Hong & K. Y. Pan. A, a lower leaf; B, involucrate bracts and sepals. Drawn by Miss LI Ai-Li from D. Y. Hong *et al.* H97010.

2–6. Sepals 4–5, glabrous, all caudate at the apex, 3–3.5 cm long, 2–3 cm wide. Flowers single, petals 9 or 10 in number, rose, broadly obovate, rounded at the apex, 5–6 cm long, 4–6 cm wide. Filaments purple, anthers yellow. Disc purple. Stigma purple. Flowering from late April to early May.

The new species is closely related to *P. ostii* and *P. jishanensis* T. Hong & W. Z. Zhao based on both morphology and molecular data. It differs from *P. ostii* in having lower leaves with 9 leaflets, petals rose, while from *P. jishanensis* in having leaves glabrous, lateral leaflets ovate or ovate-lanceolate, shallowly lobed or entire, sepals all caudate at the apex, and petals rose.

Additional specimen examined:

China. Hubei (湖北): Baokang (保康), Houping Township (后坪镇), Fanshenshang Village (翻身墙村), 2005-04-24, Z. L. Dai 2005001 (PE).

Paeonia ostii T. Hong & J. X. Zhang in Bull. Bot. Res. (Harbin) 12: 223, fig. 1 (p. 231). 1992.

Paeonia suffruticosa ssp. *yinpingmudan* D. Y. Hong, K. Y. Pan & Z. W. Xie in Acta Phytotax. Sin. 36: 519, fig. 2. 1998, syn. nov. p.p., quoad specim. ex Anhui.—*Paeonia yinpingmudan* (D. Y. Hong, K. Y. Pan & Z. W. Xie) B. A. Shen in Lishizhen Medic. Mater. Med. Res. 12: 330. 2001. Type: China. Anhui (安徽): Chaohu (巢湖), Mt. Yinping (银屏山), 1997-04, K. Y. Pan & Z. W. Xie (潘开玉, 谢中稳) 9701 (PE).

Paeonia ostii T. Hong & J. X. Zhang var. *lishizhenii* B. A. Shen in Acta Phytotax. Sin. 35: 360. 1997—*Paeonia ostii* ssp. *lishizhenii* (B. A. Shen) B. A. Shen in Lishizhen Medic. Mater. Med. Res. 12: 330. 2001. Type: China. Anhui (安徽): Nanling (南陵), Yashan, alt. 200–250 m, 1984-04-18, B. A. Shen (沈保安) PB1018 (holotype in Wuhu Municipal Drug Bureau of Anhui Province; isotype, PE!).

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牡丹一新种——中原牡丹，及银屏牡丹的订正

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摘要 分子证据和新增加的形态证据显示, 银屏牡丹*Paeonia suffruticosa* ssp. *yinpingmudan*作为新亚种发表时所依据的两份标本实为两个实体, 产自安徽巢湖的(潘开玉和谢中稳9701, 模式)实为凤丹*P. ostii*的成员, 而产自河南嵩县的(洪德元等H97010)实为一个新分类群。本文把*P. suffruticosa* ssp. *yinpingmudan*处理为*P. ostii*的异名, 并依据河南的标本描述了一个新种——中原牡丹*P. cathayana* D. Y. Hong & K. Y. Pan。中原牡丹与凤丹和矮牡丹*P. jishanensis*近缘, 区别在于前者下部叶有11–15片小叶, 花白色; 后者小叶背面有毛, 裂片多, 萼片顶端圆钝, 花白色。

关键词 牡丹属; 分类订正; 新种; 中原牡丹; 银屏牡丹; 中国